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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 10/697,035 | 10/31/2003 | Naoto Jikutani | 242058US2CIP | 1110 |

22850 7590 03/03/2006

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| EXAMINER | |
|---|---|
| MENEFEE, JAMES A | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2828 | |

DATE MAILED: 03/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/697,035 | JIKUTANI ET AL. | |
| | Examiner | Art Unit | |
| | James A. Menefee | 2828 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *12 January 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-125* is/are pending in the application.

4a) Of the above claim(s) *1-62 and 79-125* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *63-78* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/085,204.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/31/03; 12/29/05*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of Species IV, subspecies (a), in the reply filed on 1/12/2006 is acknowledged. Claims 63-78 are readable thereon and examined herein.

Claims 1-62 and 79-125 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim.

### *Priority*

Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:

The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

The disclosure of the prior-filed application, Application No. 10/085,204, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application.

It is noted that the parent case discloses DBRs having intermediate layers between the high and low refractive index layers. The parent case also discusses such layers having various thicknesses. But the parent case does not disclose different intermediate layers in different regions of the same DBR having different thicknesses as required by the claims. There is further nothing about the intermediate layer thickness corresponding to an electric field within the DBR or varying based on a doping level. Thus the claims are not enabled by the parent application, and are not entitled to the filing date of the parent application. If the examiner is mistaken then applicant is requested to specifically point out in detail how the parent case enables the present claims. The effective date of this application is 10/31/2003, the filing date of this application. See MPEP 2133.01 ("When applicant files a continuation-in-part whose claims are not supported by the parent application, the effective filing date is the filing date of the child CIP."); see also MPEP 210.11.

Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copies have been filed in parent Application No. 10/085,204 filed on 2/26/2002.

Applicant cannot rely upon the foreign priority papers to overcome the following rejections because a translation of said papers has not been made of record in accordance with 37 CFR 1.55. See MPEP § 201.15. Additionally, since there is no support for the claims found in parent case 10/085,204, then it is presumed that the foreign applications also do not have support and therefore applicant is not entitled to those dates.

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 73 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 73 recites the limitation "said active layer." There is insufficient antecedent basis for this limitation in the claim.

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 63, 68, and 73 are rejected under 35 U.S.C. 102(b) as being anticipated by Jewell et al. (US 4,949,350).

Regarding claim 63, Jewell discloses in Fig. 6 a semiconductor DBR 22 comprising an alternate stacking of first and second semiconductor layers 72,74 and 104,106 having respective different refractive indices (since they are made of AlAs and GaAs), and a plurality of intermediate layers 78,76 sandwiched between the first and second semiconductor layers, said

intermediate layers having a refractive index intermediate between that of the first and second semiconductor layers (must be intermediate since these layers are composed of both AlAs and GaAs, see Fig. 7), and an intermediate layer 78 provided in one region of the DBR having a thickness different than an intermediate layer 78 in a different region of the DBR (i.e. 22.6 nm vs. 4.52 nm, see Fig. 6).

Regarding claim 68, the device is a VCSEL comprising the DBR 22. See Fig. 1.

Regarding claim 73, active layer 18 is shown in more detail in Fig. 5 and contains any of Ga and In, and As.

Claims 63, 65-68, 70-73 are rejected under 35 U.S.C. 102(e) as being anticipated by Villareal et al. (US 6,850,548).

Regarding claims 63 and 68, Villareal discloses a DBR (and a surface emitting laser using such a DBR) comprising an alternate stacking of first and second semiconductor layers having different refractive indices, and a plurality of intermediate layers (transition regions in Villareal) each sandwiched between a first and a second semiconductor layer. See, e.g., abstract first sentence. The first and second semiconductor layers are GaAs and AlAs, and the intermediate layers are $Al_xGa_{1-x}As$ and therefore the intermediate layers have a refractive index intermediate between that of the semiconductor layers. See Table 1 on col. 6. The intermediate layers in a first region of the DBR have a thickness different from intermediate layers in a different region of the DBR. See col. 6 lines 21-23.

Regarding claims 65-66 and 70-71, the transition regions (i.e. intermediate layers) having different thicknesses and doping concentrations within said DBR corresponding to an electric

field strength within the DBR. The thickness is higher and doping concentration lower where the electric field strength is large, and the thickness is lower and doping concentration higher where the electric field strength is small. Col. 5 line 50 – col. 6 line 2.

Regarding claims 67 and 72, the DBR is for use at 1310 nm, falling within the range as claimed. Col. 6 lines 10-11.

Regarding claim 73, the active layer 20 is formed of AlGaAs, thus including the elements as claimed. Col. 4 lines 49-50.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 64, 69, and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villareal in view of the admitted prior art.

Regarding claims 64 and 69, Villareal discloses the limitations of parent claims 63 and 68 as noted above. Regarding claim 75, the limitations of parent claim 74 are taught as noted below. It is not disclosed that a difference in bandgap between the first and second semiconductor layers is smaller in a region where the intermediate layer has an increased thickness than in a region where the intermediate layer has a reduced thickness.

The admitted prior art (see specification p. 19-21) teaches that the bandgap difference between the semiconductor layers of a DBR may be reduced in the region where doping is lower.

It would have been obvious to one skilled in the art to do this in Villareal's laser so that electrical resistance in the DBR may be further reduced, as taught by the admitted prior art. The region of Villareal's DBR where doping is lowest is the region where the intermediate layer has an increased thickness, see rejection of claim 66 above, therefore making this obvious change will meet the claim limitations.

Claims 74 and 76-78 are rejected under 35 U.S.C. 103(a) as being unpatentable over Villareal. Villareal discloses the limitations of the claims as in the above rejections of claims 68 and 70-72. It is not disclosed that there is an array of surface emitting lasers. But it is well known in the art that a plurality of surface emitting lasers may be formed in an array. It would have been obvious to one skilled in the art to form a plurality of Villareal's surface emitting lasers in an array so that higher output power may be achieved, as is known.

## *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Menefee whose telephone number is (571) 272-1944. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, MinSun Harvey can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

James Menefee
February 22, 2006